

REMARKS

Claims 1-20 remain in this application, and claims 1-20 have been rejected.

Claims 1-4 and 9-20 have been rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Number 6,341,066 (“Murowaki”) in combination with U.S. Patent Number 4,684,183 (“Kinoshita”). Claims 1, 15, and 17 are the only independent claims. Claims 5 and 7 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Murowaki in combination with Kinoshita, and further in combination with U.S. Patent Number 5,834,934. Claim 6 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Murowaki in combination with Kinoshita, and further in combination with U.S. Patent Number 5,528,093. Claim 8 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Murowaki in combination with Kinoshita, and further in combination with U.S. Patent Number 5,707,249.

Each one of independent claims 1 and 17 is limited to an electrical device having “a flexible printed circuit board attached to at least a portion of the exterior of said housing . . . and further having at least one heat-generating electrical component mounted on the outside surface thereof.” Independent claim 15 is limited to “attaching a flexible printed circuit board to at least a portion of the surface of said housing . . . and further having at least one heat-generating electrical component mounted on the outside surface thereof.” Further, each one of claims 1, 15, and 17 is limited to having “heat generated upon operation of said electrical component [] transferred to said housing and dissipated therefrom into the surroundings.” Neither one of the cited references, Murowaki and Kinoshita, include any of these claim limitations.

The Cited References Do Not Teach Or Suggest a Flexible Printed Circuit Board Having “At Least One Heat-Generating Electrical Component Mounted On The Outside Surface Thereof”

Regarding Murowaki, the office action has alleged that claims 1, 15, and 17 disclose “a flexible printed circuit board (13), said board having a circuit printed thereon, and further having at least one heat generating electrical component (5) mounted on the outside surface (11) thereof.” Office Action at p. 2, ¶ 2. A close inspection of Murowaki,

however, shows that the disclosed “flexible printed circuit board (13)” does not have “at least one heat generating electrical component (5) mounted on the outside surface (11) thereof.”

Murowaki discloses two flexible printed circuit boards, *i.e.*, flexible printed circuit boards 13, 14, which are shown in one or more of FIGs. 2A, 2B, 5B, 6, 7A, 7B, 8B, 8C, 9A, 9B, 10A, 10B, 11, 12A, and 12B. None of these figures show any components (whether heat generating electrical components or otherwise) that are mounted on the outside surface (or any other surface) of the flexible printed circuit boards 13, 14. Although the specification discloses mounted electronic components, the electronic components are not mounted to either of the flexible circuit boards 13, 14. For example, the specification describes that electronic components are “mounted on [a] control circuit board 9” (col. 4, ll. 23-27), that “drive elements 5 also are provided . . . but are mounted on a separate board” (the drive circuit board 11), “from the control circuit board 9” (col. 4, ll. 64-66), and that “electronic components including the drive element 5a are mounted on the drive circuit board 11 to form a predetermined drive circuit” (col. 7, ll. 32-34).

From the above citations, it is clear that elements 5 are not mounted on the outside surface of the flexible circuit boards 13, 14. Further, the office action allegation could make sense only if the outside surface of the flexible circuit board disclosed by Murowaki would be referenced using number 11. All the figures cited above, along with the specification, show that reference number 11 refers to a separate component, *i.e.*, the drive circuit board, and not to a surface of the flexible circuit boards 13, 14.

One of the basic principles of patent law is that “[a]ll words in a claim must be considered in judging the patentability of that claim against the prior art.” *In re Wilson*, 424 F.2d 1382, 1385 (C.C.P.A. 1970). In accordance with the principle listed above, one of the requirements for establishing *prima facie* obviousness of a claimed invention is that all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981 (C.C.P.A. 1974). In our case, it is clear that Murowaki does not disclose at least one claim limitation: “a flexible printed circuit board . . . having at least one heat-generating electrical component mounted on the outside surface thereof.” Similarly,

Kinoshita does not disclose, and the office action does not allege that Kinoshita discloses, the above listed claim limitation.

Thus, Applicants respectfully submit that claims 1, 15, and 17 are allowable for at least the above-stated applicable reasons. In addition, if an independent claim is nonobvious, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988). Accordingly, Applicants respectfully submit that claims 2-14, 16, and 18-20 are allowable for at least the above-stated applicable reasons.

The Cited References Do Not Teach Or Suggest a Flexible Printed Circuit Board Attached To “At Least A Portion” Of The Exterior/Surface “Of Said Housing”

Referring to claims 1, 15, and 17, the office action acknowledges that Murowaki “fails to disclose a flexible printed circuit board attached to at least a portion of the exterior of the housing.” Office Action at p. 2, ¶ 2. The office action alleges, however, that Kinoshita discloses “in figure 1A, column 1, lines 51-64, a flexible printed circuit board (30) attached to at least a portion of the exterior of the housing,” and that it would have been obvious for a person of ordinary skill in the art at the time the invention was made to modify the device of Murowaki “to include the printed circuit board attached to at least a portion of the exterior of the housing as taught by Kinoshita.” *Id.*

Kinoshita does not disclose a flexible printed circuit board that is attached to at least a portion of a housing. The specification text cited in support of the office action’s allegation describes “an elongated insulating housing having an elongated opening through which a flexible printed circuit is inserted.” Col. 1, ll. 52-54 (emphasis added). Referring to FIG. 1A and to column 2, line 60 to column 3, line 12, Kinoshita discloses a flexible printed circuit 30 that is “bonded to the outer surface of [a] spring member 40,” not to a housing 10. While claims 1, 15, and 17 are limited to a flexible circuit board that is attached to at least a portion of a housing, Kinoshita discloses a flexible circuit that is bonded to a spring, which does not serve as a “housing” for any “electrical apparatus” or “electro-mechanical device” (as required by one or more of claims 1, 15, and 17).

Thus, Applicants respectfully submit that claims 1, 15, and 17 are allowable for at least the above-stated applicable reasons. Further, applicants respectfully submit that claims 2-14, 16, and 18-20 are allowable for at least the above-stated applicable reasons.

There Is NO Suggestion Or Motivation To Modify Or To Combine Murowaki And Kinoshita Such That “Heat Generated Upon Operation Of Said Electrical Component Is Transferred To Said Housing And Dissipated Therefrom Into The Surroundings”

Another requirement for establishing a *prima facie* case of obviousness is that “there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings.” Manual Of Patent Examining Procedure, Eighth Edition, Incorporating Revision No. 1, February 2003, § 2142, page 2100-124. There is no suggestion in Murowaki and Kinoshita, nor in the knowledge generally available to one of ordinary skill in the art, for modifying or combining the two references.

The main purpose of the flexible printed circuit (also referred to in Kinoshita as “FPC”) disclosed in Kinoshita is to provide “a highly-reliable connection [that] can be achieved by removably inserting the FPC into the female contacts in the array by a simple operation.” Col. 2, ll. 11-13. The flexible printed circuit disclosed in Kinoshita is used to achieve a desired mechanical result, *i.e.*, “a highly-reliable connection.” There is no teaching in Kinoshita suggesting that the use of the flexible printed circuit can help in the transfer and dissipation of generated heat. In contrast, one of the objectives for using the flexible printed circuit board of claims 1, 15, and 17 is to have “heat generated upon operation of said electrical component [] transferred to said housing and dissipated therefrom into the surroundings.” While the flexible printed circuit of Kinoshita is directed to providing a mechanical solution, the flexible printed circuit board of the present invention is directed to providing a thermal solution. Clearly, Kinoshita and Murowaki do not disclose an electrical device such that “heat generated upon operation of said electrical component is transferred to said housing and dissipated therefrom into the surroundings.”

Thus, Applicants respectfully submit that claims 1, 15, and 17 are allowable for at least the above-stated applicable reasons. Further, applicants respectfully submit that claims 2-14, 16, and 18-20 are allowable for at least the above-stated applicable reasons.

Conclusion

Reconsideration of this application in light of the foregoing remarks is respectfully requested.

It is believed that no fee is presently due; however, should any additional fees be required (except for payment of the issue fee), the Commissioner is authorized to deduct the fees from Jenkens & Gilchrist, P.C. Deposit Account No. 10-0447, Order No. 47181-00252.

Date: April 6, 2004

Respectfully submitted,

By 

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